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Azimuthal dependence of the fractional parton energy loss in Cu+Au collisions at √(s_NN) = 200 GeV

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The state of strong interacting matter consisting of asymptotically free quarks and gluons is called a quark-gluon plasma (QGP). This state can be created in relativistic collisions of heavy ions [1]. High-energy partons (quarks and gluons) produced in hard interactions propagate in QGP and lose energy, after which they fragment into hadrons. This leads to the suppression of the hadron yields at high transverse momenta in nucleus–nucleus collisions compared to proton–proton collisions (jet quenching effect) [2].
In the experiment, it is possible to obtain estimates of the fractional parton energy loss Sloss, which is defined as the ratio of the parton energy loss to their initial energy. For this purpose, the measured invariant spectra of ^{0}-mesons in nucleus-nucleus and proton-proton collisions are used [3]. Therefore, the the transverse momentum p_T and the number of participants Npart dependences of the Sloss can be measured. Using data on elliptic flows v_2, which make a dominant contribution to the azimuthal anisotropy of π0-mesons yields, it is possible to obtain the azimuthal dependence of the fractional parton energy loss $S_{loss}()$ [3, 4]. The obtained dependences can be used to study the spatial distribution of various characteristics of QGP.
In this work, the azimuthal dependence of the fractional parton energy loss was measured as a function of p_T and Npart in Cu+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV.
The results of the work can be expanded for use in the MPD and SPD experiments at the NICA collider.
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